

Studies on some *Tetracotyle* Fillipi (1859) metacercariae from fishes of Lucknow

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Abstract. Three unknown *Tetracotyle* metacercariae, collected from piscine host, have been described. *Tetracotyle pandei* n.sp., *Tetracotyle srivastavai* n.sp. and *Tetracotyle ramalingi* n.sp. were collected from the visceral organs and musculature of *Channa punctatus* (Bl.). They are characterised by the shape and position of pseudosuckers, shape of hold fast organ and hold fast gland, number and position of genital rudiment and pattern of reserve excretory system.

Keywords. *Tetracotyle pandei* n.sp.; *Tetracotyle srivastavai* n.sp.; *Tetracotyle ramalingi* n.sp.; metacercariae; *Channa punctatus* (Bl.).

*Tetracotyle pandei** n. sp

Host : *Channa punctatus* (Bl.)

Location : mesenteries and liver of infected host

Locality : Lucknow

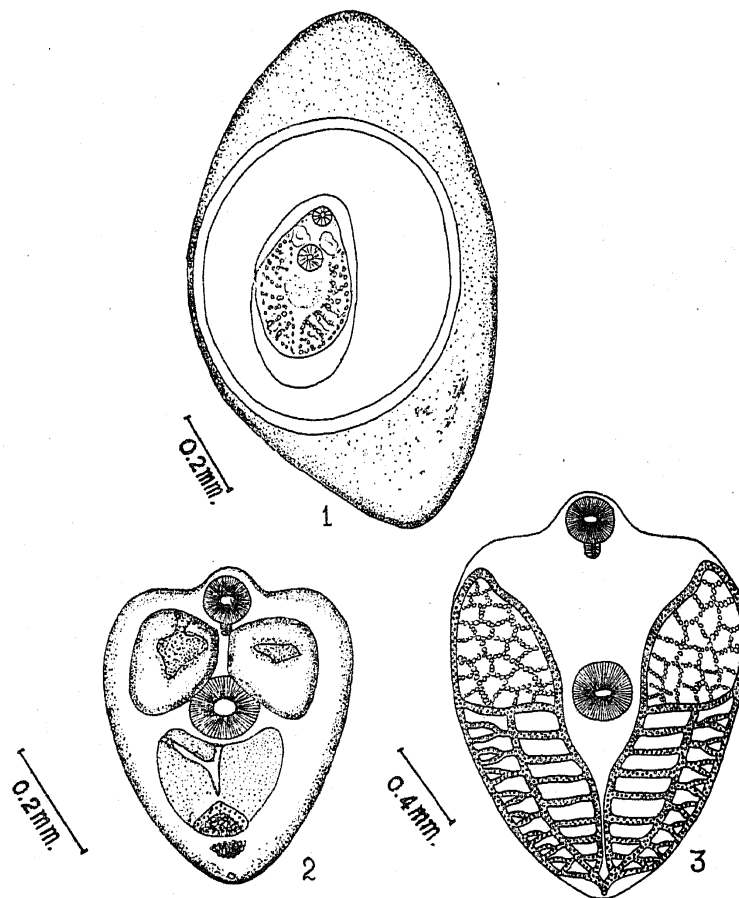
Number of host examined : 55

Number of host found infected : 3

Measurements in mm. Cyst—1.22–1.24 × 0.75–0.76, outer layer—1.22–1.24 × 0.75–0.76, middle layer—0.66–0.69 and inner layer—0.44–0.46 × 0.24–0.26. Body—1.80–1.82 × 1.32–1.33 (live) and 0.52–0.57 × 0.40–0.50 (fixed). Oral sucker—0.13–0.14 (live) and 0.07–0.08 (fixed). Ventral sucker 0.19–0.20 (live) and 0.09–0.10 (fixed). Pharynx—0.04–0.07 (live) and 0.02–0.03 (fixed). Pseudosucker—0.15–0.18 × 0.13–0.14 (fixed). Hold fast organ—0.08–0.09 × 0.05–0.06 (fixed).

Oval cyst (figure 1) three layered. Outer layer thick, fibrous, tough and pigmented, middle and inner layers thin. Body (figure 2) aspinose, with broad anterior and narrow posterior ends. Ventral sucker equatorial, larger. Large triangular pseudosucker one pair, posterior to oral sucker. Host fast gland triangular, deeply stained cell mass. Mouth terminal. Pharynx round and muscular.

* The species has been named in honour of Late Prof. B P Pande.



Figures 1-3. *Tetracotyle pandei* n.sp. 1. Encysted metacercaria (drawn from a live specimen). 2. Metacercaria (drawn from a fixed specimen). 3. Metacercaria showing reserve excretory system (drawn from a live specimen).

Oesophagus and intestinal caeca not visible. Genital rudiments two, anterior rudiment at the posterior border of hold fast organ, posterior rudiment in the posterior body region.

The excretory system (figure 3) of secondary reserve excretory system and a primary system of flame cells. "V" shaped excretory bladder at posterior end with terminal excretory pore giving rise to three pairs of canals, outer, middle and inner longitudinal canals. Each inner and outer longitudinal canals joined in the region of pseudosuckers, forming an isthmus of small canals. Median longitudinal canal, running up to the region of ventral sucker. Seven transverse canaliculae to inner longitudinal canal and eight bifurcated transverse canaliculae to outer longitudinal canal. Whole reserve excretory system filled with freely moving, round excretory corpuscles. Primary system of flame cells not observed.

Discussion

The present form chiefly differs from the other species in having three layered cyst and the pattern of reserve excretory system. It can be further differentiated from

T. ranae (Kaw 1950) in having a cyst, from *T. xenentodoni* (Chakrabarti 1970b) and *T. muscularis* (Chakrabarti 1970a) in the ratio of suckers, from *T. sophoriensis* (Singh 1956), *T. glossogobi* (Chakrabarti 1970c) and *T. tandoni* (Pandey 1973) in having an undivided body, from *T. indicus* (Singh 1956) by the number of genital rudiments, from *T. baughi* (Pandey 1973), *T. lymnaei* (Pandey and Agrawal 1978), *T. lucknowensis*, (Pandey 1971b) *T. lali* (Pandey 1971a), and *T. szidati* (Chakrabarti and Baugh 1970) in the position of pseudosuckers and shape of hold fast organ and *T. bufoi* (Agrawal 1975) in having a well-developed ventral sucker.

It, however, closely resembles with *Tetracotyle* of *Apatemon pellucidus* Yamaguti 1933 and *Tetracotyle* of *Apatemon fuligulae* Yamaguti 1933. It can be distinguished from *Tetracotyle* of *A. pellucidus* by the number of genital rudiments and from *Tetracotyle* of *A. fuligulae* in having two masses of genital rudiments and in the absence of prepharynx. It differs from *T. communis* and *T. diminuta* Hughes, 1928 in the pattern of excretory system and number of genital rudiments.

***Tetracotyle srivastavai* n. sp.**

Host : *Channa punctatus* (Bl.)

Location : mesenteries

Locality : Lucknow

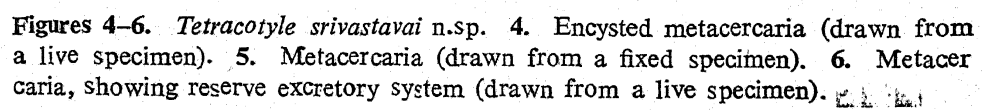
Number of hosts examined: 55

Number of hosts found infected: 2

Measurements in mm. Cyst— $3.18-3.19 \times 1.57-1.59$ (live) and $1.68-1.70 \times 0.84-0.85$ (fixed). Forebody— $2.01-2.03 \times 1.37-1.39$ (live) and $1.34-1.36 \times 1.12-1.14$ (fixed). Hindbody— $0.44-0.45 \times 0.77-0.79$ (live) and $0.34-0.36 \times 0.55-0.57$ (fixed). Oral sucker— $0.18-0.19$ (live) and $0.08-0.09$ (fixed). Ventral sucker— $0.25-0.27$ (live) and $0.16-0.18$ (fixed). Pseudosuckers— $0.44-0.45 \times 0.14-0.16$ (live) and $0.23-0.24 \times 0.13-0.14$ (fixed). Pharynx— $0.09-0.10 \times 0.07-0.08$ (live) and $0.05-0.06 \times 0.035-0.04$ (fixed). Oesophagus— $0.57-0.58$ (live) and $0.30-0.31$ (fixed). Hold fast organ— $0.45-0.47 \times 0.38-0.40$ (live) and $0.30-0.32 \times 0.29-0.31$ (fixed).

Oval cyst (figure 4) thin, transparent, single layered, with colourless fluid. Aspinose body (figure 5) divided into large fore and small hind body. Ventral sucker larger, equatorial. Pseudosuckers muscular, oval, in oesophageal region. Mouth terminal. Pharynx oval and muscular. Intestinal caeca up to the hold fast organ. Hold fast organ elongated, multilobed, with prominent cavity. Hold fast gland "U"-shaped, posterior to hold fast organ. Small mass of genital rudiment in posterior body region.

Small excretory bladder (figure 6) "V"-shaped, at hind end of body. Two main longitudinal canals, from excretory bladder run anteriorly up to oral sucker. Two transverse canals, anterior and posterior, joined by three lateral longitudinal and one median longitudinal canal. Inner lateral longitudinal canals of two sides, joined together in ventral sucker region by a short, median transverse canal. Main longitudinal canal and three lateral longitudinal canals of each side, joined together by 10-14 short transverse canaliculae.



Figures 4-6. *Tetracotyle srivastavai* n.sp. 4. Encysted metacercaria (drawn from a live specimen). 5. Metacercaria (drawn from a fixed specimen). 6. Metacercaria, showing reserve excretory system (drawn from a live specimen).

Discussion

The present larva shows close resemblance with *T. ranae* Kaw 1950 ; *T. ujjainensis* Trivedi 1964 ; *T. muscularis* Chakrabarti 1970a ; *T. baughi* and *T. tandoni* Pandey 1973 and *T. lymnaei* Pandey and Agrawal 1978 in having a divided body. However, it differs from *T. ranae* and *T. ujjainensis* in the ratio of suckers, from *T. muscularis* in the ratio of suckers and genital rudiment, from *T. baughi* and *T. tandoni* in the number of genital rudiment and lobed hold fast organ and from *T. lymnaei* in the number of genital rudiment. It also differs from all the above species in having different pattern of reserve excretory system.

This form shows resemblance also with *T. communis* Hughes 1928 ; *Tetracotyle* of *A. pellucidus* Yamaguti 1933 and *Tetracotyle* of *A. fuligulae* Yamaguti 1933. However, it differs from *T. communis* in having lobed hold fast organ, from *Tetracotyle* of *A. pellucidus* in the number of genital rudiment and from *Tetracotyle* of *A. fuligulae* in having lobed hold fast organ and in the absence of a prepharynx.

Tetracotyle ramalingi n. sp.

Host : *Channa punctatus* (B1.)

Location : muscle fibres of infected host

Locality : Lucknow

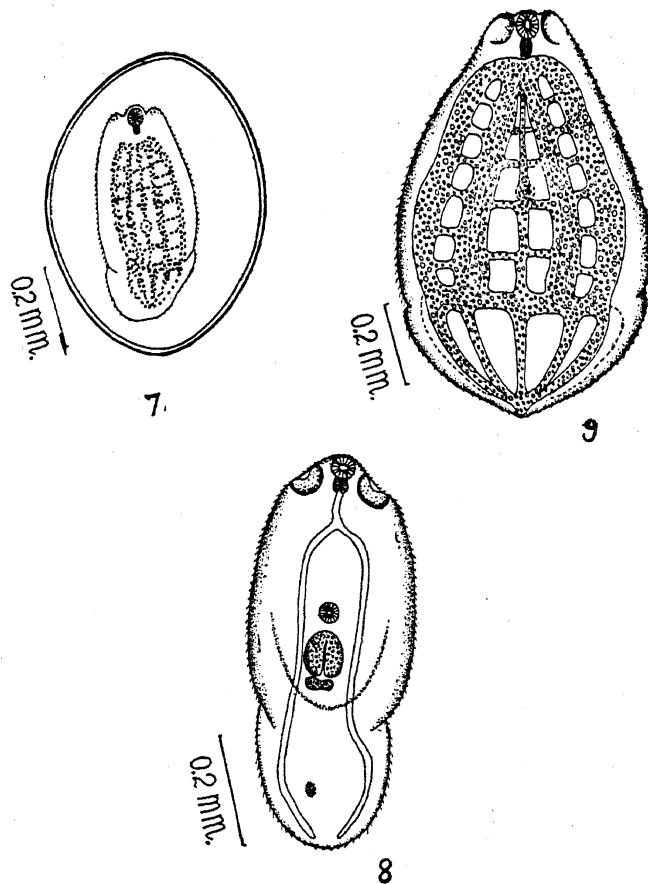
Number of hosts examined : 55

Number of hosts found infected : 2

Measurements in mm. Cyst—0.74–0.75 × 0.56–0.57 (live) and 0.40–0.43 × 0.37–0.38 (fixed). Forebody—0.70–0.72 × 0.60–0.62 (live) and 0.50–0.52 × 0.30–0.33 (fixed). Hindbody—0.30–0.32 × 0.58–0.60 (live) and 0.20–0.22 × 0.24–0.26 (fixed). Oral sucker—0.06–0.07 (live) and 0.04–0.05 (fixed). Ventral sucker—0.04–0.05 (live) and 0.025–0.03 (fixed). Pseudosuckers—0.08–0.09 × 0.05–0.055 (live) and 0.06–0.07 × 0.03–0.04 (fixed). Pharynx—0.04–0.05 × 0.03–0.04 (live) and 0.03–0.04 × 0.03–0.035 (fixed). Oesophagus—0.05–0.06 (live) and 0.03–0.04 (fixed). Hold fast organ—0.08–0.09 × 0.07–0.075 (fixed).

Cyst (figure 7) oval, thick and double layered. Outer layer thicker. Body (figure 8) oval, spinose and divided. Forebody larger. Oral sucker round, terminal and larger. Ventral sucker equatorial in forebody. Pseudosuckers lateral, muscular and kidney-shaped. Mouth leading to oval, muscular pharynx. Intestinal caeca up to posterior body region. Hold fast organ round to oval posterior to ventral sucker. Bilobed hold fast gland, close to hold fast organ. Single mass of genital rudiment in posterior hind body region.

Four longitudinal excretory canals (figure 9) from cornu of "V"-shaped excretory bladder, running anteriorly up to pharynx, joined anteriorly by anterior transverse canal, and posteriorly, by posterior transverse canal. Median longitudinal canal descending from anterior transverse canal up to posterior transverse canal. Further, longitudinal canals joined together by 5–8 transverse canaliculae.



Figures 7-9. *Tetracotyle ramalingi* n.sp. 7. Encysted metacercaria (drawn from a live specimen). 8. Metacercaria (drawn from a fixed specimen). 9. Metacercaria, showing reserve excretory system (drawn from a live specimen).

Discussion

The present form shows resemblance with *T. ranae* Kaw, 1950 ; *T. ujjainensis* Trivedi 1964 ; *T. muscularis* Chakrabarti 1970a; *T. baughi* Pandey 1973 ; *T. tandoni* Pandey 1973 ; and *T. lymnaei* Pandey and Agrawal 1978 in having a divided body. It differs from *T. ranae* in presence of oesophagus from *T. ujjainensis* and *T. lymnaei* in the number of genital rudiment from *T. tandoni* and *T. baughi* in the relative size of suckers and number of genital rudiments and from *T. muscularis* in having a bilobed hold fast gland and poorly developed genital rudiments.

It resembles also with *Tetracotyle* of *A. pellucidus* Yamaguti, 1933 and *Tetracotyle* of *A. fuligulae* Yamaguti 1933 in having a divided body. However, it differs from *Tetracotyle* of *A. pellucidus* in the ratio of suckers and number of genital rudiments and from *Tetracotyle* of *A. fuligulae* in the ratio of suckers and absence of prepharynx.

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